

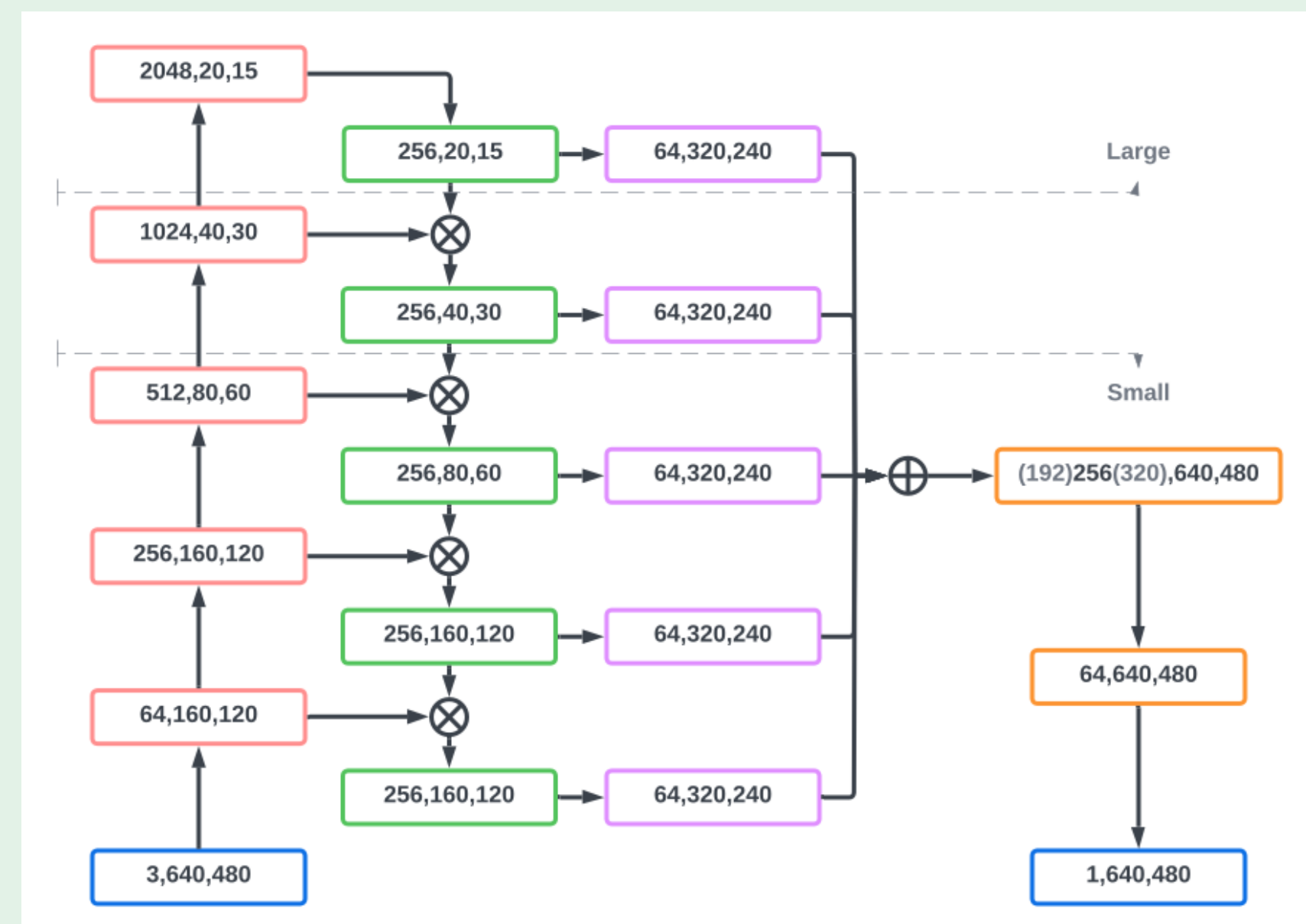
## Context

### Main motivation

- Segment the important plant parts
- Easier post-processing
- Speed / Robustness
- Good embedded performance

## Architecture

- Feature pyramid network[3]
- Variable size



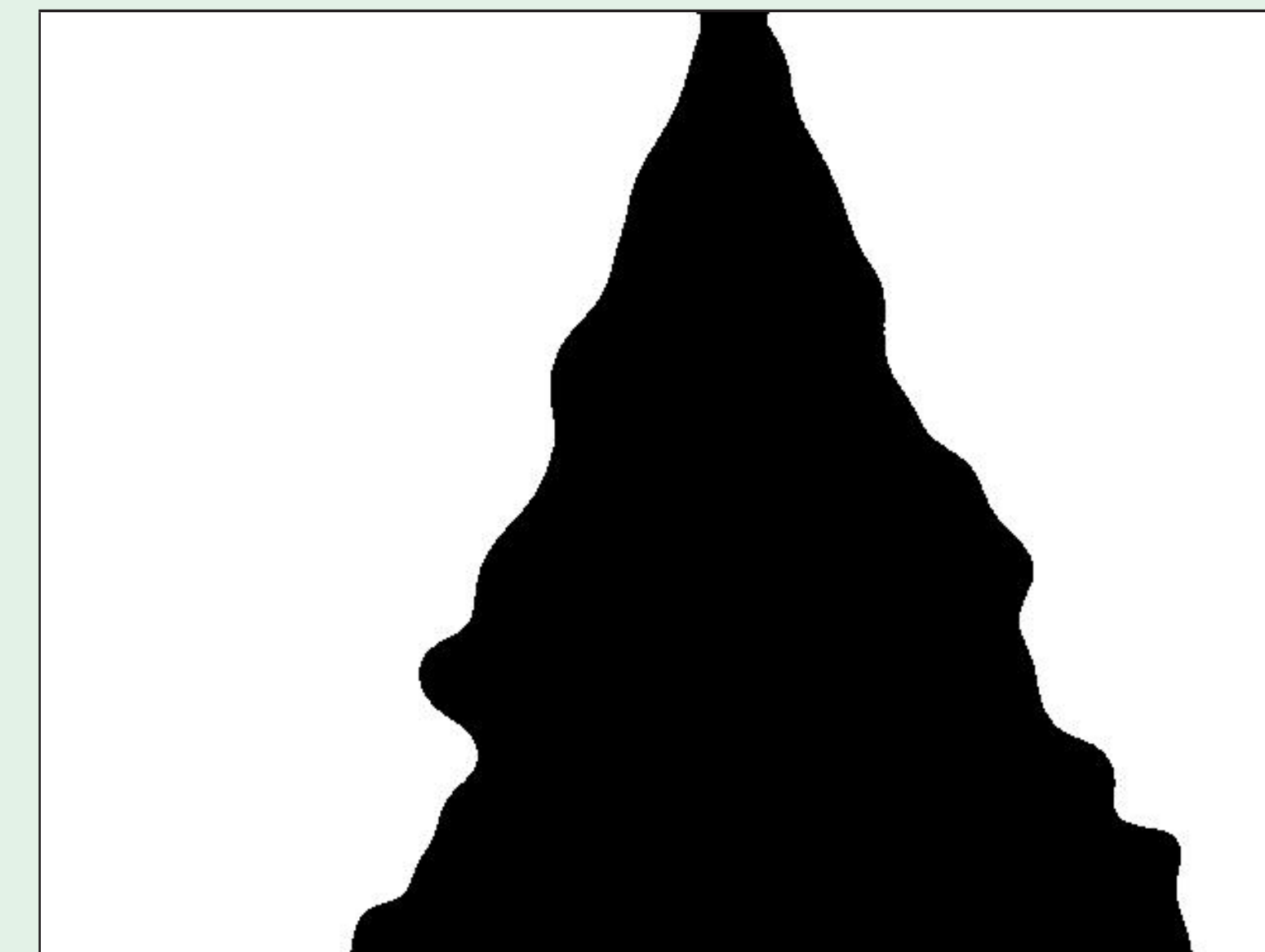
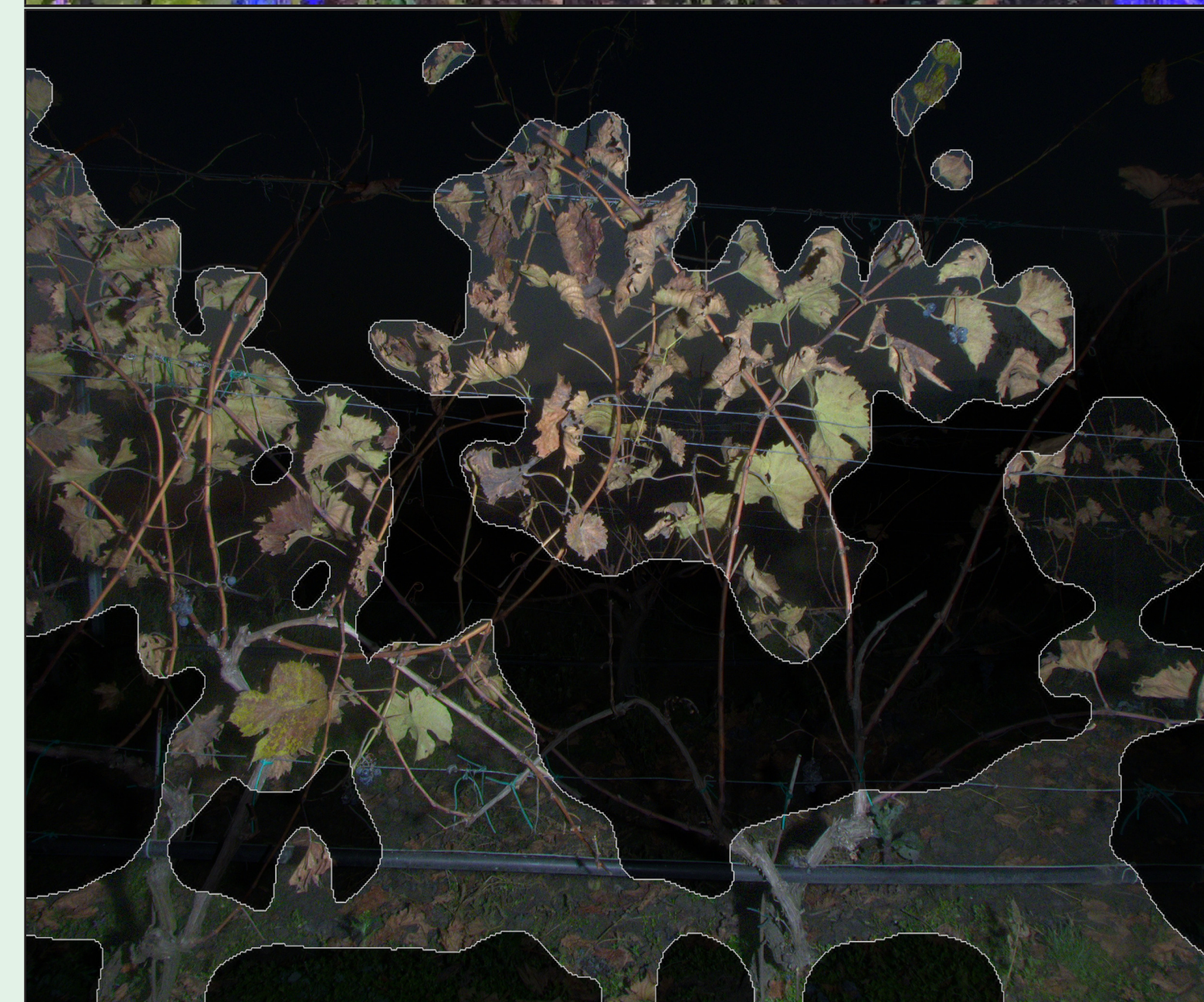
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## Numerical comparison

|           | Acc[%]      | FP[%]       | FN[%]       | IoU[%]       | Time[s]      | Device                | Time[s] |
|-----------|-------------|-------------|-------------|--------------|--------------|-----------------------|---------|
| OwnL      | <b>94.7</b> | 3.36        | <b>1.95</b> | <b>77.78</b> | 0.022        | Nvidia RTX3080 (10GB) | 0.012   |
| Own       | 94.26       | 3.08        | 2.66        | 76.91        | 0.018        | Nvidia A100 (40GB)    | 0.018   |
| OwnS      | 92.93       | 4.3         | 2.77        | 73.88        | <b>0.005</b> | Nvidia TeslaT4 (16GB) | 0.019   |
| MRCNN[2]  | 92.71       | 5.17        | 2.11        | 73.16        | 0.177        | Jetson Xavier NX      | 0.085   |
| MNetV3[1] | 87.02       | <b>2.28</b> | 10.7        | 48.27        | 0.072        | Intel®Core™ i9-10900K | 0.811   |
|           |             |             |             |              |              | Intel®Xeon®Gold 6226R | 0.934   |
|           |             |             |             |              |              | Intel®Core™ i7-6700K  | 1.579   |

## Results



## Datasets

- Own at Cluj-Napoca, Romania. Using a DJI Mini 2 drone with a 4K camera
- Aghi et al. 2021[1]
- 600 total images of 640x480



## References

- [1] Diego Aghi, Simone Cerrato, Vittorio Mazzia, and Marcello Chiaberge. Deep Semantic Segmentation at the Edge for Autonomous Navigation in Vineyard Rows. In *IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2021, Prague, Czech Republic, September 27 - October 1, 2021*, pages 3421–3428. IEEE, 2021.
- [2] Kaiming He, Georgia Gkioxari, Piotr Dollár, and Ross B. Girshick. Mask R-CNN. In *IEEE International Conference on Computer Vision, ICCV 2017, Venice, Italy, October 22-29, 2017*, pages 2980–2988. IEEE Computer Society, 2017.
- [3] Tsung-Yi Lin, Piotr Dollár, Ross Girshick, Kaiming He, Bharath Hariharan, and Serge Belongie. Feature Pyramid Networks for Object Detection. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, pages 2117–2125, 2017.